Phosphorus Loads Upstream (Arkansas) and Downstream (Oklahoma) of Lake Frances: Are Differences Due to Monitoring Program Design, Natural Variation, or the Lake?

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Abstract
The Illinois River originates in Arkansas and flows into Oklahoma where it designated as a scenic river. A dispute between the states over water quality in the Illinois River reached the U.S. Supreme Court in 1992. Lake Frances is a very small impoundment on the Illinois River that spans the border between Arkansas and Oklahoma. Results of water quality monitoring have shown apparent differences between nutrient concentrations upstream (Arkansas) and downstream (Oklahoma) of the lake. In Oklahoma, results have shown increasing trends in phosphorus loads. The sampling and load calculation are performed by different agencies on the different sides of the state line and monitoring strategies have changed over the years. The goal of this project was to identify the reasons for the differences between the states and to investigate the influence of Lake Frances on phosphorus concentrations and transport. This study used water sampling, sediment sampling, and historical data to evaluate changes in phosphorus concentrations and loads upstream and downstream of Lake Frances during base flow and surface runoff flow regimes. Results should help us determine whether differences between the states are due to monitoring differences, natural variation in sampling and load calculation, or the influence of Lake Frances.